

REMARKS

Claim Rejections Under 35 U.S.C §102(b):

Claims 53-60, 63, and 68-73 stand rejected under 35 U.S.C. §102(b). More particularly, the Examiner contends in the Office Action that United States Patent No. 6,002,952 to Diab et al. (hereafter Diab) anticipates Claims 53-60, 63, and 68-73. Applicant respectfully disagrees that Diab discloses the inventive combination of features included in independent Claims 53 and 68 as presently presented and therefore respectfully traverses the Examiner's rejection of independent Claims 53 and 68 and dependent claims 54-60, 63, and 69-73 based on Diab. In this regard, as summarized more fully below, Diab does not teach or render obvious to one skilled in the art, processing of plethysmographic signals obtained in a first domain wherein the plethysmographic signals are transformed into a second domain different from the first domain, log transformations are applied to the plethysmographic signals in the second domain to obtain log transformed plethysmographic signals in the second domain, and the log transformed plethysmographic signals in the second domain are transformed into a third domain different from the first and second domains.

More particularly, independent Claim 53 is directed to a method of processing at least first and second plethysmographic signals obtained from a patient, the first and second plethysmographic signals being obtained in a first domain, that includes transforming the first and second plethysmographic signals from the first domain to a second domain different from the first domain to obtain first and second plethysmographic signals in the second domain, applying log transformations to the first and second plethysmographic signals in the second domain to obtain first and second log transformed plethysmographic signals in the second domain, transforming the first and second log transformed plethysmographic signals in the second domain to a third domain different from the first and second domains to obtain first and second plethysmographic signals in the third domain, and examining at least the first and second plethysmographic signals in the third domain to obtain information therefrom relating to a physiological condition of the patient.

Likewise, Claim 68 is directed to a pulse oximeter, including, among other elements a digital processor enabled to demultiplex a series of sample values into first and second plethysmographic signals in a first domain, transform the first and second plethysmographic

signals in the first domain into first and second plethysmographic signals in a second domain different than the first domain, apply log transformations to the first and second plethysmographic signals in the second domain to obtain first and second log transformed plethysmographic signals in the second domain, transform the first and second log transformed plethysmographic signals in the second domain into first and second plethysmographic signals in a third domain different than the first and second domains, and examine at least the first and second plethysmographic signals in the third domain to obtain information therefrom relating to a physiological condition of the patient.

In contrast with Applicant's claimed method, Diab does not disclose a signal processing method or pulse oximeter in which log transformations of plethysmographic signals occur between transformation of plethysmographic signals from a first domain into a second domain and subsequent transformation of the plethysmographic signals into a third domain. In this regard, Figure 17 of Diab depicts a transform based pulserate detection process in which an input time domain plethysmographic waveform $f(t)$ is fed into a Fourier transform block 1702 which forward transforms $f(t)$ into the frequency domain to obtain $F(\omega)$, a magnitude block 1703 finds the magnitude of $F(\omega)$, a second Fourier transform block 1704 transforms the magnitude of $F(\omega)$ into a complex signal $G(x)$, block 1705 extracts the real portion of $G(x)$ which is fed into $1/x$ mapping block 1706 the output of which is fed into a pulserate detector block 1707. (See Diab Figure 17 and Column 20, lines 35-56). Diab mentions that in an alternate embodiment, magnitude block 1703 can be replaced by a block which extracts the real portion of the waveform and that block 1705 which extracts the real portion of $G(x)$ can be replaced by a magnitude block that extracts the magnitude of $G(x)$. (See Diab, column 20, lines 57-61). Thus, Diab does not teach use of a log transform between the two Fourier transforms in Figure 17 or elsewhere, and does not anticipate the inventive combinations of Claims 53 and 68.

In fact, in describing additional embodiments, Diab specifically states: "Furthermore, it will be understood that transformations of measured signals other than logarithmic conversion ... are possible". (See Diab column 22, line 66 through Column 23, line 3). Thus, Diab actually discourages one skilled in the art from performing post-frequency domain log transformations when processing plethysmographic signals obtained from a patient, and therefore Diab cannot be relied upon in combination with knowledge available to those skilled in the art to render obvious

the inventive combinations of Claims 53 and 68.

Statutory Double Patenting Claim Rejections:

Claims 65 and 69 stand rejected under 35 U.S.C. §101. In this regard, the Examiner contends that Claim 65 and 69 claim the same invention as Claims 21 and 31 of prior related U.S. Patent No. 6,650,918. Applicant respectfully submits that Claims 65 and 69 as presently presented are not identical to Claims 21 and 31 of U.S. Patent No. 6,650,918 and requests that the statutory double patenting rejection of Claims 65 and 69 be withdrawn.

Non-Statutory Double Patenting Claim Rejections:

Claims 53-64, 66-68, and 70-76 stand rejected under the judicially created of obviousness-type double patenting. In this regard, the Examiner contends that such claims are not patentably distinct from Claims 1, 2, 4, 6, 13-15, 21-23, 31, 32, and 35-40 of prior related U.S. Patent No. 6,650,918. Applicant respectfully submits that Claims 53-64, 66-68, and 70-76 as presently presented are patentably distinct from Claims 1, 2, 4, 6, 13-15, 21-23, 31, 32, and 35-40 of U.S. Patent No. 6,650,918 and requests that the obviousness-type double patenting rejection of such claims be withdrawn.

Conclusion:

In view of the foregoing, Applicant believes that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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